IN THE CLAIMS:

The status of the claims is as follows:

1-33. (Canceled)

34. (Previously Presented) An encoded micron-sized semiconductor or insulator particle having an integral and ordered physical multi-layer porosity structure with multiple porosity interfaces between consecutive multiple porosity layers, the multiple porosity layers having multiple optical thicknesses, wherein the physical multi-layer structure is configured to produce an optical signature in the form of an interference pattern in the reflectivity spectrum that uniquely corresponds to a single particular etching a code from a library of codes that was used to create the particle via a computer waveform controlled etch..

35. (Canceled).

36. (Canceled)

37. (Previously Presented) The particle of claim 34, further comprising a receptor within the pores of the physical multi-layer porosity structure.

38. (Original) The particle of claim 37, wherein said receptor is a receptor for a biological analyte.

39. (Original) The particle of claim 37, wherein said receptor is a receptor for a chemical analyte.

40. (Original) The particle of claim 37, wherein said receptor is a receptor for

a gaseous analyte.

41. (Previously Presented) The particle of claim 37, further comprising a fluorescence tag within the pores of the particle for assaying the particle

42. (Original) The particle of claim 34, wherein the thin film comprises porous silicon.

43. (Canceled).

44. (Canceled).

45. (Previously Presented) A library of optically encoded particles, comprising a plurality of particles of claim 35, each individual particle has a unique integral and ordered physical multi-layer porosity structure with multiple porosity interfaces between consecutive multiple porosity layers, the multiple porosity layers having multiple optical thicknesses, wherein the physical multi-layer structure is configured to produce an optical signature in the form of an interference pattern in the reflectivity spectrum that uniquely corresponds to a single particular etching a code from a library of codes that was used to create the particle via a computer waveform controlled etch..